

THAT WHICH IS CLAIMED IS:

1. An apparatus for depositing a thin film, the apparatus comprising:
  - a) a reaction chamber;
  - b) a reaction gas provider to supply a reaction gas and/or inert gas to the reaction chamber;
  - c) an oxidant provider to supply a first oxidant and a second oxidant to the reaction chamber; and
  - d) an air drain to exhaust gas from the apparatus;
  - e) wherein the oxidant provider is operable to supply the second oxidant to the reaction chamber using the first oxidant as a transfer gas.
2. The apparatus of Claim 1 wherein the oxidant provider is further operable to supply the first oxidant to the reaction chamber without the second oxidant.
3. The apparatus of Claim 1 wherein the oxidant provider is operative to supply the second oxidant to the reaction chamber from a liquid source of the second oxidant.
4. An apparatus for depositing a thin film, the apparatus comprising:
  - a) a reaction chamber;
  - b) a reaction gas provider to supply a reaction gas and an inert gas to the reaction chamber;
  - c) an oxidant provider to supply a first oxidant and a second oxidant to the reaction chamber; and
  - d) an air drain to exhaust gas from the apparatus;
  - e) wherein the oxidant provider includes:  
an oxidant generator to generate the first oxidant;  
an oxidant container to store the second oxidant;  
a first supply line to supply the first oxidant directly to the reaction chamber from the oxidant generator; and

a second supply line fluidly connecting the oxidant generator to the reaction chamber via the oxidant container to supply the second oxidant to the reaction chamber using the first oxidant as a transfer gas.

5. The apparatus of Claim 4 wherein the oxidant provider is further operable to supply the first oxidant to the reaction chamber without the second oxidant.

6. The apparatus of Claim 4 including:

- a) a first process valve installed in the first supply line to selectively interrupt and permit flow of the first oxidant toward the reaction chamber; and
- b) a first selection valve that operates inversely to the first process valve, to selectively interrupt and permit the flow of the first oxidant toward the oxidant container from the oxidant generator.

7. The apparatus of Claim 4 including a second process valve that operates inversely to the first process valve to selectively interrupt and permit flow of the second oxidant toward the reaction chamber from the oxidant container.

8. The apparatus of Claim 4 wherein the oxidant generator is operable to generate ozone.

9. The apparatus of Claim 4 including H<sub>2</sub>O stored in the oxidant container.

10. The apparatus of Claim 4 wherein the oxidant container includes:

- a) a canister, wherein the second oxidant is disposed in the canister up to a predetermined level;
- b) a pressurization line positioned over the second oxidant in the canister to provide the first oxidant to the canister; and

c) a gas supply line positioned over the second oxidant in the canister to exhaust the mixture gas of the first and second oxidants from the canister;

d) wherein the pressurization line is connected to the oxidant generator and the gas supply line is connected to the reaction chamber.

11. An apparatus for depositing a thin film comprising:

a) a reaction chamber;

b) an oxidant generator to generate a first oxidant;

c) an oxidant container;

d) a second oxidant stored in the oxidant container;

e) a reaction material container;

f) a reaction gas stored in the reaction material container;

g) an inert gas generator to generate an inert gas;

h) a drainage pump to exhaust gas from the apparatus;

i) a first supply line to supply the first oxidant directly to the reaction chamber from the oxidant generator;

j) a second supply line connecting the oxidant generator to the reaction chamber via the oxidant container to provide the second oxidant to the reaction chamber using the first oxidant as a transfer gas;

k) a third supply line to supply the inert gas directly to the reaction chamber from the inert gas generator;

l) a fourth supply line connecting the inert gas generator to the reaction chamber via the reaction material container to supply the reaction gas to the reaction chamber using the inert gas as a transfer gas; and

m) a drainage line diverging from the fourth supply line to exhaust the inert gas directly to the drainage pump.

12. The apparatus of Claim 11 including a liquid source of the second oxidant stored in the oxidant container.

13. The apparatus of Claim 11 including:

- a) a first process valve installed in the first supply line to selectively interrupt and permit flow of the first oxidant toward the reaction chamber;
- b) a first selection valve that operates inversely to the first process valve to selectively interrupt and permit flow of the first oxidant toward the oxidant container from the oxidant generator; and
- c) a second process valve that operates inversely to the first process valve to selectively interrupt and permit flow of the second oxidant toward the reaction chamber from the oxidant container.

14. The apparatus of Claim 11 including:

- a) a third process valve installed in the third supply line to selectively interrupt and permit flow of the inert gas toward the reaction chamber;
- b) a second selection valve installed in the fourth supply line upstream from the reaction material container to selectively interrupt and permit flow of the inert gas toward the reaction material container; and
- c) a drainage valve installed in the drainage line and that operates inversely to the second selection valve to selectively interrupt and permit flow of the inert gas toward the drainage pump.

15. The apparatus of Claim 11 including:

- a) a first supply valve to selectively interrupt and permit flow of the first and second oxidants toward the reaction chamber;
- b) a second supply valve to selectively interrupt and permit flow of the inert gas toward the reaction chamber; and
- c) a third supply valve to selectively interrupt and permit flow of the reaction gas that flows toward the reaction chamber.

16. The apparatus of Claim 15 including:

- a) a first bypass valve that operates inversely to the first supply valve to exhaust the first and second oxidants to the drainage pump;

- b) a second bypass valve that operates inversely to the second supply valve to exhaust the inert gas to the drainage pump; and
- c) a third bypass valve to exhaust the reaction gas to the drainage pump.

17. The apparatus of Claim 11 wherein the oxidant generator is operable to generate ozone.

18. The apparatus of Claim 11 including H<sub>2</sub>O stored in the oxidant container.

19. The apparatus of Claim 11 wherein the oxidant container comprises:

- a) a canister, wherein the second oxidant is stored in the canister up to a predetermined level;
- b) a pressurization line positioned over the second oxidant in the canister to provide the first oxidant to the canister; and
- c) a gas supply line positioned over the second oxidant in the canister to exhaust the second oxidant from the canister;
- d) wherein the pressurization line is connected to the second supply line upstream from the oxidant container, and the gas supply line is connected to the second supply line downstream of the oxidant container.

20. An apparatus for depositing a thin film, the apparatus comprising:

- a) a reaction chamber;
- b) an oxidant generator to generate a first oxidant;
- c) an oxidant container to generate a second oxidant;
- d) a second oxidant stored in the oxidant container;
- e) a reaction material container;
- f) a reaction gas stored in the reaction material container;
- g) an inert gas generator to generate an inert gas;
- h) a drainage pump to exhaust gas from the apparatus;
- i) a first supply line to supply the first oxidant directly to the reaction chamber from the oxidant generator;

j) a second supply line connecting the oxidant generator to the reaction chamber via the oxidant container to provide the second oxidant to the reaction chamber using the first oxidant as a transfer gas;

k) a third supply line to supply the inert gas directly to the reaction chamber from the inert gas generator; and

l) a fourth supply line diverging from the third supply line and connecting the inert gas generator to the reaction chamber via the reaction material container to supply the reaction gas to the reaction chamber using the inert gas as a transfer gas.

21. The apparatus of Claim 20 including a liquid source of the second oxidant stored in the oxidant container.

22. The apparatus of Claim 20 including:

a) a first process valve installed in the first supply line to selectively interrupt and permit flow of the first oxidant toward the reaction chamber;

b) a first selection valve to selectively interrupt or permit flow of the first oxidant toward the first oxidant container from the oxidant generator; and

c) a second process valve that operates inversely to the first process valve to selectively interrupt and permit flow of the second oxidant to the reaction chamber from the oxidant container.

23. The apparatus of Claim 20 including:

a) a third process valve installed in the third process line to selectively interrupt and permit flow of the inert gas toward the reaction chamber;

b) a second selection valve that operates inversely to the third process valve to selectively interrupt and permit flow of the inert gas toward the reaction material container from the inert gas generator; and

c) a fourth process valve that operates inversely to the third process valve to selectively interrupt and permit flow of the reaction gas toward the reaction chamber from the reaction container.

24. The apparatus of Claim 20 including:

- a) a first supply valve to selectively interrupt and permit flow of the first and second oxidants toward the reaction chamber; and
- b) a second supply valve to selectively interrupt and permit flow of the inert gas and the reaction gas toward the reaction chamber.

25. The apparatus of Claim 24 including:

- a) a first bypass valve that operates inversely to the first supply valve to selectively exhaust the first and second oxidants toward the drainage pump; and
- b) a second bypass valve that operates inversely to the second supply valve to exhaust the inert gas and the reaction gas toward the drainage pump.

26. The apparatus of Claim 20 wherein the oxidant generator is operable to generate ozone.

27. The apparatus of Claim 20 including H<sub>2</sub>O stored in the oxidant container.

28. The apparatus of Claim 20 wherein the oxidant container includes:

- a) a canister, wherein the second oxidant is stored in the canister up to a predetermined level;
- b) a pressurization line positioned over the second oxidant in the canister to provide the first oxidant to the canister; and
- c) a gas supply line positioned over the second oxidant in the canister to eject a mixture of the first and second oxidants from the canister;
- d) wherein the pressurization line is connected to the second supply line upstream from the oxidant container, and the gas supply line is

connected to the second supply line downstream from the oxidant container.

29. A method for depositing a thin film, the method comprising:

(a) supplying a reaction gas to a reaction chamber; and

(b) supplying a mixture of a first oxidant and a second oxidant to the reaction chamber, wherein the first oxidant is used as a transfer gas for the second oxidant gas.

30. The method of Claim 30 further including supplying the first oxidant to the reaction chamber without the second oxidant.

31. The method of Claim 30 including providing a liquid source of the second oxidant.

32. The method of Claim 31 including:

(a) providing a vapor phase of the second oxidant above the liquid source; and

(b) mixing the first oxidant with the vapor phase of the second oxidant.

33. The method of Claim 30 wherein the first oxidant is ozone and the second oxidant is water vapor.